

SUPPORT FOR THE AMENDMENT

Support for the amendment to claim 5 is found in claim 5 as originally presented. No new matter would be added to this application by entry of this amendment.

Upon entry of this amendment, claims 1-20 will remain active in this application.

REQUEST FOR RECONSIDERATION

The claimed invention is directed to a process for preparing chloride gas by catalyzed oxidation of hydrogen chloride with molecular oxygen.

Synthesis of chlorine gas has typically be produced by electrolysis of sodium chloride which also produces sodium hydroxide. While market demands for chlorine have increase, demand for sodium hydroxide has not kept pace. Accordingly, the previously used Deacon process, in which chlorine gas is produced by oxidation of hydrogen chloride, has received renewed interest. The Deacon process is reported to suffer from the formation of hot spots which can deteriorate catalyst activity such that multiple reaction zone reactors have been developed in which catalytic activity is matched to the temperature reaction profile. Such multiple reaction zones can make processing more complex and accordingly, operation of the Deacon process under more simple conditions are sought.

The claimed invention addresses this problem by providing a method of preparing chlorine by catalytically oxidizing hydrogen chloride with molecular oxygen, wherein the reactor is equipped with heat-exchange plates that are arranged in the longitudinal direction of the reactor and have a spacing between them with the fixed bed catalyst packed there between. Applicants have discovered that operation of the Deacon process in a reactor in which the fixed bed catalyst is packed between spaces between heat exchange plates, allows for reduction of hot spots and therefore extension of catalyst life while providing good catalytic activity. Such a process is nowhere disclosed or suggested in the cited references of record.

The rejections of claims 1, 4-9, 13, 14 and 16-20 under 35 U.S.C. 103(a) over Iwanaga et al. EP 1170250 in view of Filippi EP 1153653, of claim 2 in further view of Hoos et al. U.S. 4,922,042, of claims 3 and 12 in further view of Kuhn et al. U.S. 4,329,27, of

claims 10 and 15 in further view of Smith et al. U.S. 3,807,963 and of claim 11 in further view of Stowell U.S. 3,911,843 and Grau U.S. 5,391,853 are respectfully traversed.

None of the cited references disclose or suggest that operation of the Deacon process in an apparatus in which the fixed bed catalyst is disposed between spaces between heat-exchange plates, would reduce hot spots and allow for the operation of the process in a single reaction zone.

Iwanaga et al. describes a Deacon process in which is carried out in at least two reaction zones arranged in series, at least one of the reaction zones being provided with a heat exchange system to control the temperature. At least two reaction zones are used (paragraph[0016]) which allows for packing of at least two kinds of catalysts having different activities (paragraph [0017]). Thus, while the reference pays attention to temperature regulation, there is no suggestion that reaction in a reactor equipped with heat exchange plates in a configuration as claimed, would be sufficient at reducing hot spots, to the extent that a plurality of reaction zones **is not necessary**.

In contrast, the claimed invention is directed to a Deacon process for producing chlorine in which the reactor has heat-exchange plates with spacing there between and a fixed-bed catalyst in gaps between the heat exchange plates. Applicants have discovered such a configuration allows for production of chlorine gas, without the need to provide two or more separate reaction zones, which is required in the cited reference.

Applicants respectfully submit that the claimed invention would not have been obvious, as there would have been no expectation that a heat-exchange plate configuration, as claimed, would allow for production, without necessitating at least two reaction zones. The failure to anticipate such a result is implicit to Iwanaga's disclosure in which, in spite of providing the system with a heat exchange system, at least two reaction zones is described as

essential. The advantages of a heat-exchange plate configuration as claimed were not recognized by Iwanaga such that the claimed process would not have been obvious.

The basic deficiencies of the primary reference are not cured by Filippe et al.

Filippi et al. merely describes a reactor for carrying out exothermic or endothermic reactions in which parallel plate heat exchangers are embedded in a catalyst layer. There is no suggestion that such a configuration would allow for oxidative **production of chlorine** without the need for at least two reaction zones.

None of the tertiary references cure the basic deficiencies of the combination of primary and secondary references as none of the cited tertiary references suggest that a heat-exchange plate configuration as claimed would allow for the oxidative production of chlorine without the need for at least two reaction zones.

Since the cited references fails to suggest that chlorine could be produced oxidatively without the need for at least two reaction zones, the claimed invention is not rendered obvious and accordingly, withdrawal of the rejections under 35 U.S.C. 103(a) is respectfully requested.

The rejection of claim 5 under 35 U.S.C. 112, second paragraph has been obviated by appropriate amendment.

Claim 5 has been amended to restore the language that hydrogen chloride and molecular oxygen are fed into gaps between heat-exchange plates. In view of applicants' amendment, withdrawal of this ground of rejection is respectfully requested.

Applicants submit that this application is now in condition for allowance and early notification of such action is earnestly solicited.

Respectfully submitted,

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